prescribe a different course, viz., to retain as authority for a species the name of the original describer, and that is the course adopted in, I think, most of the *Challenger* reports, and by very many zoologists. I may state briefly as an example the first case that occurs to me—I have no systematic books here to refer to. (1) About 1870 Cunningham described a new Ascidian as *Cynthia gigantea*. (2) About 1880 Herdman transferred that species to the genus *Molgula*. (3) In the *Challenger* report this species figures as *Molgula gigantea*, Cunningham; and I would submit that that, rather than the course indicated in the review, is "under the generally accepted rules of nomenclature." W. A. HERDMAN.

Tarbert, Loch Fyne, August 23.

An Earthquake Investigation Committee.

It may perhaps interest you and your readers to hear that by the Imperial ordinance of June 25 a committee has been established for the investigation of the earthquake phenomena, with the view of finding methods of predicting earthquakes, if possible, and of ascertaining the nature of construction, building, and otherwise, best calculated to resist the effect of the shocks. President Kato, of the Imperial University, has been nominated the president, and myself the secretary. Other members of the Committee are Furnichi (Director and Professor of Civil Engineering, Engineering College, and Head of the Engineering Bureau of the Department of the Interior), Tatonno (Professor of Architecture, Engineering College), Tanabe (Professor of Civil Engineering, Engineering College), Tanakadate (F.R.S.E., and Professor of Physics, Science College), and Nagaoka (Assistant Professor of Physics, Science College), Koto (Professor of Geology, Science College), and Kochibe (of the Geological Survey), Sekiya and Omori (Seismologists), Nakamura (of the Meteorological Bureau), and a foreign member, Prof. J. Milne Other members will be nominated by and by. The Parliament has granted 42,000 yen for this year, chiefly for the purchase of various instruments. The committee will be glad to receive any communication or suggestion on the subject. Address: Earthquake Investigation Committee, care of the Department of Education, Japan. D. KIKUCHI.

Imperial University, Tokyo, July 21.

Prehistoric Epochs.

I DO not think that the English authors who have written on prehistoric times have divided the Pleistocene in *epochs*, as Prof. G. de Mortillet has done in France. Would it be possible to use in England subdivisions similar, or almost similar, to those used in France, and almost generally adopted, although that classification is often subject to criticism?

According to Prof. G. de Mortillet, Palæolithic silex have been found in England that could be respectively related (1) to the type of Chelles or *Chelléen* (Hoxne, Biddenham); (2) to the type of the Moustier or *Moustérien* (Creswell, High Lodge); (3) to the type of Solutré or *Solutréen* (Creswell); (4) and to the type of La Madeleine or *Magdalénien* (Creswell, Kent's Hole). The same author says that at Creswell (Derbyshire) Palæolithic silex belonging to the *Moustérien*, *Solutréen*, and *Magdalénien* divisions have been found *in situ*, superposed as in the French stations, and according to him his classification could be adopted for the English prehistoric stations. Is that the opinion of the English authors who have most recently written on the matter, and is it possible to make a classification founded on the objects of the human prehistoric industry, parallel to the palæontological and stratigraphical classifications? EDMOND BORDAGE.

Muséum d'Histoire Naturelle de Paris, August 2.

At Portrush.

BEING on holiday (at Portrush) in the second week of August, I discovered growing on the sand dunes there the following species, bearing beautiful pure white blossoms. I found several patches of each:—

Thymus Serpyllum (wild thyme); *Prunella vulgaris* (self-heal); *Gentiana campestris* (field gentian); *Erica Tetralix* (cross-leaved heath).

Also the wild strawberry, bearing abundantly white fruit. Are these cases of reversion or of adaptability? Moths were very plentiful all over the dunes. JAMES RIGG.

18, Wilton Drive, Glasgow, Aug. 18.

Origin of Idea that Snakes Sting.

WILL you kindly inform me as to the origin of the idea that snakes sting? Froude, in "The English in Ireland," page 356, vol. i., writes: "The clergy started as if stung by a snake." Archdeacon Farrar, in "Darkness and Dawn," uses the metaphor of snakes stinging. Sir T. Browne ("Vulgar Errors") says "That snakes and vipers sting," &c., &c., "is not easily to be justified. It is not fair to bring in Shakespeare as to a matter of natural history. CYRIL FRAMPTON.

July 29.

ON THE RELATIVE CONTAMINATION OF THE WATER-SURFACE BY EQUAL QUANTITIES OF DIFFERENT SUBSTANCES.

THE experiments of Lord Rayleigh and Prof. Roentgen on the thickness of the invisible films of oil on contaminated water-surfaces led me to repeat these measurements by a somewhat different method, which may perhaps be worth describing, and at the same time to compare the contaminating effect of various substances.

In order to divide very small masses exactly I chose the course of Lord Rayleigh[1] of transferring the contaminating substance to the water-surface by means of a volatile solvent. But instead of ether I used *benzine*, and let the drops of the solution evaporate *directly from the water* instead of vaporizing them on a metal plate and then immersing this, as Lord Rayleigh did.

As a fixed condition of the water-surface Lord Rayleigh chose the tension when the movements of camphor fragments are stopped. Still more suitable for my purpose, however, I found another smaller degree of contamination, which is always to be fixed with great exactness. I mean *that degree at which the tension just begins to sink*. As I have already explained (NATURE, vol. xliii. No. 1115, p. 437) the sinking of tension does not begin gradually from the very commencement of contamination, but *abruptly*, when the latter has arrived at a certain value, and then the falling of tension takes place very rapidly. The state of constant tension I have called the normal and that of variable tension the anomalous condition.

My task was therefore to examine how much of a substance is required to make a surface of a given size enter the anomalous state or to find the area of a surface made anomalous by a given mass of the substance. The latter method was generally preferred, for it was more convenient to me.

The observations were made with the adjustable trough and balance[2] described in NATURE, March 12, 1891, p. 437, and were as follows:—

Of the substance to be tried 13 mg. were dissolved in 300 ccm. of benzol. Then the trough being filled with water and the surface made as clean as possible by sliding the partition all over the length of it several times, the solution was transferred to the surface in drops, each of which had a volume of 31 cmm. or about 1/9600 of the whole solution and thus contained 0·001354 mg. Four drops were introduced each time in order to equalize accidental irregularities of size. When the evaporation of the benzol was finished I diminished the length of the surface till it became anomalous, and this length was noted. Then immediately other four drops were introduced, again measured, and so on. After two or more observations the surface was cleaned anew, but generally the first length was observed to be a little too large on account of the imperfect purity of the surface.

A sufficient number of observations having been thus made, the original contamination of four drops of the

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[1] Proc. of the Royal Society, 1890, vol. xlviii., No. 293, p. 127.

[2] For the purpose of actual measurements of surface-tension, I have constructed another instrument of larger dimensions; but to indicate only a slight variation of tension, any sensible balance with an adhering disc or wire-ring of any shape and size may be employed.

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benzol used was measured in the same way; by subtracting this from the contaminating effect of the solution I got the effect of the oil or other substance purposely dissolved.

Thus with three solutions of Provence oil of equal concentration I got the length of the surface rendered anomalous by the oil contained in four drops:—

Solution I., 8·3cm.; Sol. II., 7·8cm.; Sol. III., 7·7cm.

For the sake of verification the other method, viz., counting the drops required for making the whole surface of the trough anomalous, was also employed. By this course the effect of four drops was obtained as follows:—

Solution I., 8·0cm.; Sol. II., 7·9cm.; Sol. III., 7·7cm.

The close agreement of the two methods proves that the strip of plate, simply laid across the trough, is sufficient to separate normal surfaces.

Another trial with an *ethereal* solution of olive-oil gave 7·1cm., if the somewhat different size of the drops be regarded; but I preferred benzine, because its original contamination was in most cases only between 1·3cm. and 2·5cm., whilst that of ether amounted to 4 to 6cm.

The mean of the lengths got by the three solutions was 7·9cm., and by this combined with the width of the trough = 5·8cm., we obtain the area of the surface made anomalous by 1mg. of Provence oil:

$$\frac{7{\cdot}9 \cdot 5{\cdot}8}{4.0{\cdot}001354} = 8460 \text{ qcm.}$$

or a density of 0·000118mg. per qmm. at the beginning of the anomalous state.

In the following table are collected the results obtained with different substances:—

Substance.	qcm. per mg.	mg. per qcm.
Provence oil	8460	0 000118
Ordinary olive oil	8565	0·000117
Oleine [1]	8137	0 000123
Rape-seed oil	7388	0·000135
Poppy oil	8994	0·000111
Tallow	9636	0·000104
Spermaceti	5568	0·000179
Stearic acid	4711	0·000212
Resin (colophony)	8105	0·000123
Turpentine oil (clear)	107	0·009346
Turpentine oil (older)	2944	0·000339

The table shows next that the mass required for lowering the tension is not the same with different substances, and on the other hand it affords an interesting comparison between fluid and solid bodies. If the cause of the lowered tension be a film of greasy fluid spread over the surface, the contaminating effect of solid bodies can only be explained by small quantities of such fluids present on the surface or in the interior of the solid. This may be so in many cases, but the effect of stearic acid and spermaceti is such as if more than half their weight consisted of oil. The strong effect of colophony, although this did not dissolve entirely in benzine, and the result that tallow acts more strongly than an equal weight of oleine, its fluid component, also appear to me very remarkable.

After this it seems to me very probable that the contaminating substances *are not spread in coherent films at all*, but rather in a state of very fine distribution between the superficial water-molecules, that must be named either *emulsion* or *solution*.

However, only certain organic substances seem to be capable of forming surface-solutions of this kind, whilst the effect of metals and salts, formerly observed by me, was due to incomplete cleanness of the bodies, as later researches have proven.

Finally I will add some remarks on the thickness of the hypothetical oil-films. The thickness calculated from my observations with olive oil is at the beginning of the anomalous state 1·3 $\mu\mu$. In order to derive from this number the thickness at any other condition of the surface, it needs only to be multiplied with the relative contamination corresponding to that condition, that is, with the ratio of the surfaces. So we get at the smallest relative contamination measurable in my apparatus = $\frac{1}{35}$ a thickness of the film = 37.10^{-3} $\mu\mu$.

For measuring the relative contamination in the anomalous state, a special mode of procedure was required on account of the imperfect separation of surfaces by the partition. For that purpose I put on the surface that is to be contracted a [-shaped swimming wire, a little shorter than the width of the trough, and by the situation of this mark, following exactly every movement of the surface, I measured the relative length of the latter, instead of reading it from the partition itself.

The ratio in which the surface must be contracted in order to arrive at the tension at which camphor comes to rest, was very different with various substances, for an instance with stearic acid = $\frac{5}{3}$, oleine = $\frac{18}{11}$, ordinary olive oil = 5, and with Provence oil the tension in question could not be reached at all, except when the oil was standing on the water in visible drops or films. The calculated thickness of the film at the stopping of camphor movements would be with oleïn = 2·13$\mu\mu$, ordinary olive oil = 6·5$\mu\mu$, and with Provence oil still greater, if this liquid were spread equally. A very precise specification of the sort of oil used therefore appears to be necessary, if observations concerning this point are to be compared.

AGNES POCKELS.

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[1] A brown-looking liquid sold under this name in the drug stores.

NOTES.

THE Federated Institution of Mining Engineers will hold its annual general meeting in North Staffordshire on Wednesday, September 7, in the large hall of the First Shropshire and Staffordshire Artillery Volunteers, Shelton. Both on that and on the following day visits will be made to various works and places of interest.

THE Committee appointed to consider whether a national aquarium should be established in Sydney have presented a full and interesting report to Mr. F. B. Sutton, the New South Wales Minister for Public Instruction. They strongly recommend that "a commodious building of a substantial and not unsightly character" should be erected, to contain a large series of tanks constituting the public aquarium, with experimental tanks for researches on fish-breeding, &c., in connection with the fisheries of the colony, and laboratories for scientific investigation. It is calculated that the "initial cost" would be about £10,000, and that an annual amount of about £1200 would be needed for salaries and for purchases, repairs, and other incidental expenses.

IN response to an invitation from President G. Stanley Hall, of Clark University, a number of psychologists met from various institutions at that University, Worcester, Massachusetts, on July 8, for the purpose of forming an American Psychological Association. Prof. G. S. Fullerton, of the University of Pennsylvania, presided. After some general discussion on the form of organization the entire matter was referred to a committee. Sessions were held in the afternoon and evening, at which papers were read by Profs. Jastrow, Sanford, and Bryan, and Doctors Nichols, Krohn, and Gilman. It was decided in response to an invitation from Prof. Fullerton to hold the next meeting of the Association in Philadelphia, at the University of Pennsylvania, on Tuesday, December 27. Prof. Jastrow was appointed secretary to provide a programme for that meeting. He asked the co-operation of all members of the Association for the section of psychology at the Chicago Exhibition, and invited correspondence on the subject.

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